

on either side and the front ones are double the size of the others. The genus *Dawsonia*, allied more or less to *Hylonomus*, Dawson, is also one of those broad frog-headed salamandroid-looking branchiate amphibia. The sculpturing of the head plates is remarkable, and there appears to be a new bone interpolated behind the post-frontal. Beneath, the vomers have teeth, and so have the long part of the pre-sphenoid, the outer portions of the pterygoids, the palatines, superior-maxillaries, and the pre-maxillaries. The clearly written book is made all the more valuable by the introduction of Miall's reports to the British Association on the labyrinthodonts, and it is pleasing to note the author's graceful recognition of the assistance, he has had in his work from British paleontologists.

P. M. D.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

An Account of some Marine Animals met with en route to the Cape September 21, 22

I AM commanded by my Lords Commissioners of the Admiralty, to transmit herewith a copy of a letter from the commanding officer of H.M.S. *Crocodile*, giving an account of some marine animals met with en route to the Cape, which may be of some interest to the readers of NATURE.

Admiralty, November 10

ROBERT HALL
H.M.S. *Crocodile*, Simon's Bay
September 30, 1879

SIR,—I think the following statement may be of some scientific interest, and have the honour to request that it may be attached to my letter of proceedings of this day's date.

Between the Lat. of $\{ 5^{\circ} 53' \}$ S., and Long. $\{ 5^{\circ} 44' \}$ E., and between the hours of moon setting and daylight on the nights of September 21 and 22, the condensers were continually heating, and the vacuum gauge suddenly dropping to zero.

On examination of strainers, it appeared that the inlet to the sea-water was choked with a marine animal to an extent that necessitated stopping and clearing four times on the night of the 21st inst., and five times on the night of the 22nd inst.

On referring to Dallas's "Natural History," the description given of the Pyrosoma, class Tunicata, order Ascidia, corresponded in all apparent particulars to the specimens I fished up from alongside and took from off the strainers. Those on the strainers were, of course, much flattened by the pressure, and those that had passed through were much attenuated.

The luminosity of the creatures was very great, and of a most brilliant sapphire colour. I have, &c.,

(Signed) F. PROBY DOUGHTY,
Captain

To Commodore Richards, A.D.C., Cape of Good Hope

Easter Island

As the reviewer of Australasia in NATURE, vol. xx. p. 598, I must ask space for a few further words with regard to Rapanui. Mr. Albert J. Mott draws conclusions with regard to the ancient navigation of the Pacific Ocean and a former condition of high civilisation of the erectors of the stone images, which will not be admitted by any scientific ethnologist. The difficulties attending the erection by savages, or very slightly civilised people all over the world, of large stones has been greatly overrated. In the case of the stone images of Easter Island, the latest observer, M. A. Pinart, who has paid great attention to this very question and published the fullest account of the matter, together with a series of excellent illustrations, finds no difficulty in accounting for their erection. He writes as follows:—"L'ensemble de ce vaste atelier de statues gigantesques les unes entièrement terminées les autres à l'état d'ébauche et

en voie d'exécution nous permet de nous rendre compte de la façon dont le travail était accompli, et de la manière dont elles étaient érigées et mise en place après leur complet achèvement. L'exécution de ce travail qui de prime abord paraît considérable, qui a tout étonné les voyageurs et suggère de nombreuses hypothèses, est cependant d'une grande simplicité."

M. Pinart then goes on to explain how the sculptures were always cut out on rocks considerably inclined, and slid down hill to the place assigned, where they were tilted by means of an inclined plane of earth and stones built up, into holes dug deep enough to bury all but the head of each statue. I must refer readers wishing for more detailed information to M. Pinart's paper, "Voyage à l'Île de Paques," *Le Tour du Monde*, 1878, p. 225, No. 927, for drawing my attention to which I am indebted to the librarian of the Royal Geographical Society, Mr. Rye.

The population of Easter Island was by some earlier voyagers estimated at as high as 1,500. It may have been greater, and as many as 500 men would certainly not be required for the erection of any of the images. There was undoubtedly a good deal of wood in the island in old times, and thus rollers and levers would be made use of. The trees of the island have now been exterminated by the inhabitants. Palmer speaks of a peculiar gesture of the modern Rapanui natives which he compares with certain features in the images. It is the opinion of experts that the general appearance of the sculptured faces is decidedly Polynesian, as far as mode of artistic treatment is concerned. Mr. Mott's conclusion that the existence of these images proves that a nation formerly existed which navigated ships to Easter Island at regular intervals, and kept the place going as a colony, will be regarded as simply absurd by any one who knows anything of the science of navigation. So small and so isolated an island as Rapanui could only be reached by navigators who had a very advanced knowledge of astronomy and navigation, and were provided with instruments of great precision, and who had determined the position of the island on maps with exact correctness. No Chinese, Japanese, Indian, or Arab navigators could have hit on the island except by accident. An exact determination of longitude, as well as of latitude is involved in the matter. A mere knowledge of the compass with even as good information concerning its variations as we now possess would not avail. The island was discovered by Reggeveen on April 5, 1722; in 1764 Commodore Byron, with two ships, sought for the island in vain; in 1766 Bougainville, with two French ships of war, sought for it also in vain; in 1767 Capt. Cartaret made the same attempt with a similar result. It was only on March 11, 1774, that Capt. Cook found the island again, and Mr. Mott would have us believe that persons who were by the undoubted evidence of their artistic capabilities and method of treatment of the human figure in sculpture, savages, were able to accomplish, as often as they wished, a feat of navigation which baffled some of the best European navigators of the eighteenth century. Even at the present day so difficult is the determination of longitude to persons not specially trained as expert navigators that the island of Bermuda, and even the Virgin Islands have been more than once reported as "gone down" by merchant captains who could not find them.

With regard to Mr. Mott's "gentle protest" against my statement that "the accepted scientific position is that primitive man was savage," no protest, whether gentle or otherwise, will alter the fact that such is the case; but it is quite superfluous to enter into a discussion here on the general theory of evolution, in accordance with which that position is maintained.

H. N. MOSELEY

Silurian Fossils in the Curlew Mountains

I BEG to state that the paragraph which occurs in NATURE, vol. xx. p. 641, that Silurian fossils have been found in beds amongst the Curlew Mountains "supposed to be old red sandstone," is not quite correct. It was very well known in this office that the beds containing the fossils were of the Silurian formation—though erroneously included within the boundary line of the old red sandstone in the Survey Map, sheet 76. Since the map was engraved, the district to the north and east has been surveyed, and a large fault was discovered, ranging in the direction of the spot where the Silurian fossils have been found. The occurrence of this fault explains the presence of the beds with Silurian fossils within the area of the tract coloured as old red sandstone. There is, therefore, nothing in the announcement in your paper of the slightest novelty, and I have only to state that if the writer

of the paragraph had communicated with myself previously to "rushing into print," he would have received such information as would have prevented him giving publicity to a statement which however literally correct, is erroneous in essence.

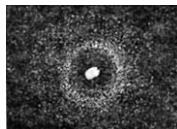
EDWARD HULL,
Director of the Geological Survey
of Ireland

Geological Survey of Ireland, Dublin, November 6

[We were indebted for the note to the courtesy of Mr. Kinahan, of the Geological Survey of Ireland.—ED.]

Lunar Ring

WHILE experimenting on the actinic power of lunar light on August 30 last (period of full moon), at 9.30 P.M., I obtained, with a minute-and-a-half exposure, a photographic negative of the moon, which shows a distinct and well-defined ring or glory around it which was not visible to the naked eye on looking directly at the moon in a clear and cloudless sky, nor was there any halo on the ground glass of the camera, nor on the lens, at the time of observation. This is a copy of it from the negative.



I used no clock-work arrangement with the camera, but allowed the moon to traverse the plate, and I have since then taken several photographic observations under various conditions. I have taken the moon in all her phases, with long and short exposures, in clear and cloudless sky, and never could get a ring even faintly defined. I have also heated the camera and screwed the cold lens into it, carried it into a colder atmosphere in order to produce condensation of dew. I have placed two small separate openings in front of the lens; on one occasion I dusted puff-ball spores upon the lens; on another I breathed warm breath upon it, but never got anything but decided burr, which was always densest near the limb of the moon and gradually tapered away towards the circumference like a bright light seen through a thick fog, but no appearance of ring. I have also taken observations when scud was passing rapidly over the moon, when perfect prismatic halos were visible to the naked eye, but no ring was ever impressed on the photographs; nothing more than a haze, such as that produced by breathing on the lens. The next full moon (September 29) was totally obscured, so that I failed to get an observation then; but last evening (October 29), at 10 P.M., I was fortunate to get one fine, clear exposure of one-and-a-half minute, and was pleased to see a clear and well-defined ring rise up on the plate during development, similar in every respect to that obtained on August 29, showing clearly that this unusual appearance is dependent upon the position of the moon in her orbit, she being in opposition when she manifests ring-giving power and shows us a crown. But why is this? What is the cause of this unusual, and, I believe, hitherto undescribed, appearance? Why should this ring be invisible to the naked eye and yet give a luminous impression on a photographic plate? Why should it appear only at full moon period and not at any other phase? Can it have any connection with what Mr. Newall saw round Mars through his huge telescope? If the moon had an atmosphere similar to that of the earth, and a star of some magnitude were occulted by the moon at that particular time, it is possible that its light in passing through the lunar atmosphere might be refracted so as to show a corona round the moon; but it is pretty generally acknowledged that there is no atmosphere surrounding it, therefore there can be no refraction.

It might be that the solar rays in passing through the upper regions of the earth's atmosphere are so defracted that the ultra-violet rays (though invisible) are thus rendered visible.

It is also possible that the doubly-reflected lunar light (the ashy light), in passing back to the moon from the earth, encounters on its passage the reflected solar rays from the moon, arresting and nullifying in proportion to its strength, so much of the light proceeding from the moon thereby causing a clear space around the moon-limb, a region of inertia, while the reflection from the disk of the earth, being larger than the moon's reflecting disk, will show itself as a ring on the outer edge of

the neutral zone, much in the same manner as two heliographic reflectors would act if they were so arranged as to throw their respective reflections directly into and upon each other, the one being small and the other larger, just as the moon is the smaller and the earth the larger body, the smaller body reflecting a smaller, brighter light, while the larger body would reflect from its broader disk a less brilliant light with a feebler force, yet not so feeble as to prevent it arresting an amount of force equal to itself.

GEORGE BERWICK

Sunderland, October 30

[Dr. Berwick's explanation appears scarcely sound for it involves the assumption that a ray of light meeting another can arrest it; and also it involves the visibility of such rays while traversing space. We would remark that faint halos due to atmospheric causes are often seen almost masked by the brightness of a full moon, and the photograph being over-exposed, so far as the moon is concerned, does not show the relative actinic brightness of moon and halo. Would Dr. Berwick try further experiments with shorter exposures, and also ascertain from a number of photographs how far on either side of full moon a halo can be photographed, and whether it is always present during similar periods?—ED.]

Phosphorescence

A FEW days ago my attention was drawn to the phosphorescence of some fish (haddock) just received from the coast. The light was most brilliant about the fins and inside of the fish, which had been gutted. A spectroscope of low dispersive power showed all the light to belong to the green part of the spectrum. Approximate measures gave 557'5 (mm.) and 488'4 as the extreme wavelengths, the part from 557'5 to 503'4 being somewhat brighter than the remainder, with a feebly indicated maximum at 527'6.

In the hope of getting a brighter spectrum the fish were washed in as small a quantity of water as possible. This water became highly phosphorescent, and when agitated in a bowl, gave beautiful luminous caustics, but neither in the bowl nor in a glass trough, nor in a tube of half-inch bore, did the liquid give a brighter spectrum than that afforded by the fish.

A large bubble of air was inclosed with the liquid in the tube. When the tube was violently agitated, it became luminous from end to end; if then held vertically, the light rapidly faded except near the top of the liquid, but on suddenly inverting the tube, the bubble of air slowly ascended, causing the whole contents of the tube to phosphoresce very brilliantly. This was a most striking phenomenon. After the lapse of some nine hours, the liquid had almost entirely lost the power of giving light.

The Observatory, Dunelm, Aberdeen, November 5

RALPH COPELAND

The "False Dawn"

FOR some time past certain considerations had led me gradually to infer that the "False Dawn" of the very extensive literature of Islam, whether Arabic, Persian, or Turkish, &c., and whether prose or verse, is another name for the "Zodiacal Light." No dictionary yet published so explains it.

I submitted my ideas and reasons to a number of English and foreign astronomers and linguists. All expressed their concurrence in those views; but direct proof of their correctness was not at once forthcoming. Recently, however, through the kindness of the Hydrographer to the Admiralty, a most obliging effort was made to solve this question by Capt. Wharton, commanding H.M.S. *Fawn*, now cruising in the Sea of Marmora. The method employed by that officer, and its conclusive result, cannot be better described than by giving his own words as follows:—

H.M.S. *Fawn*, Tuzla Bay,
September 26, 1879

Dear Capt. Evans,

For the information of Mr. Redhouse, I have to tell you that I can satisfactorily answer his question as to the false dawn of the Turks.

On the morning of the 20th instant, at 3.30 A.M., I went to a mosque at Buyukdere, and interviewed the Imaum, who, on being asked for the "fejri kyazib,"¹ at once pointed out the zodiacal light, then brightly shining in the east. . . . There can be no doubt as to the coincidence of the two.

Yours sincerely,
W. J. L. WHARTON

¹ "Fejri Kyazib" is the Arabic express on for "the false dawn."